

What is claimed is:

1. A scroll-type machine comprising:

a first scroll member having a first end plate and a first spiral wrap extending therefrom;

a second scroll member having a second end plate and a second spiral wrap extending therefrom, said first and second scroll members being positioned with said first and second spiral wraps interleaved with each other;

a drive member for causing said scroll members to orbit relative to one another whereby said spiral wraps will create pockets of progressively changing volume between a suction pressure zone and a discharge pressure zone;

10 ^A said first and second scroll member being movable between a first relationship in which sealing surfaces of said first and second scroll members are in sealing relationship to close off said pockets and a second relationship wherein at least one of said sealing surfaces of said first and second scroll members are spaced apart to define a leakage path between said pockets; and

15 a fluid operated piston secured to said first scroll, said piston being actuatable to apply a force to said first scroll to move said first scroll between said first relationship where said scroll machine operates at substantially full capacity and said second relationship in which said scroll machine operates at substantially zero capacity.

2. The scroll-type machine according to Claim 1, wherein said drive member continues to operate when said first scroll member is in said second relationship.

3. The scroll-type machine according to Claim 2, wherein said scroll-type machine includes a discharge flow path for conducting compressed fluid from said scroll-type machine and a check valve located within said flow path to prevent reverse flow of said compressed fluid.

4. The scroll-type machine according to Claim 1, wherein said fluid operated piston is operated in a time pulsed manner to modulate the capacity of said scroll-type machine.

5. The scroll-type machine according to Claim 1, further comprising a fluid pressure chamber operative to apply said force to said fluid operated piston.

6. The scroll-type machine according to Claim 5, wherein said force acts in an axial direction.

7. The scroll-type machine according to Claim 6, further comprising a first passage for supplying a pressurized fluid from said scroll-type machine to said pressure chamber.

8. The scroll-type machine according to Claim 7, further comprising a valve for controlling flow through said first passage, said valve being operative to vent said pressurized fluid from said pressure chamber to thereby enable said first and second scrolls to move between said first and second relationships.

9. The scroll-type machine according to Claim 8, wherein said valve is a solenoid operated valve.

18. The scroll-type machine according to Claim 17, wherein said valve is a solenoid valve.

19. The scroll-type machine according to Claim 18, wherein said solenoid valve is operated in a pulse width modulated mode.

20. The scroll-type machine according to Claim 17, wherein said pressure chamber is in communication with a discharge chamber defined by said shell.

21. The scroll-type machine according to Claim 16, wherein said solenoid valve is operated in a pulse width modulated mode.

22. The scroll-type machine according to Claim 21, further comprising a valve disposed between said pressure chamber and both said suction chamber and said discharge chamber.

23. The scroll-type machine according to Claim 22, further comprising a valve disposed between said pressure chamber and said suction chamber.

24. The scroll-type machine according to Claim 23, wherein said valve is a solenoid valve.

25. A scroll-type machine comprising:

a first scroll member having a first end plate and a first spiral wrap extending therefrom;

a second scroll member having a second end plate and a second spiral wrap extending therefrom, said first and second scroll members being positioned with said first and second spiral wraps interleaved with each other;

a drive member for causing said scroll members to orbit relative to one another whereby said spiral wraps will create pockets of progressively changing volume between a suction pressure zone and a discharge pressure zone;

10 ~~X~~ said first and second scroll member ^S being movable between a first relationship in which sealing surfaces of said first and second scroll members are in sealing relationship to close off said pockets and a second relationship wherein at least one of said sealing surfaces of said first and second scroll members are spaced apart to define a leakage path between said pockets;

15 a fluid operated piston secured to said first scroll and slidingly received within a bore defined by said shell, said piston being actuatable to apply a force to said first scroll to move said first scroll between said first relationship where said scroll machine operates at substantially full capacity and said second relationship in which said scroll machine operates at substantially zero capacity; and

20 a radially compliant sealing system disposed between said piston and said bore defined by said shell.

26. The scroll-type machine according to Claim 25, further comprising an annular fitting disposed between said shell and said piston, said radially complaint sealing system being disposed between said piston and said fitting.

27. The scroll-type machine according to Claim 25, wherein said radially complaint sealing system includes a lip seal.

28. The scroll-type machine according to Claim 27, wherein said radially complaint sealing system includes a floating retainer.

29. The scroll-type machine according to Claim 25, wherein said radially complaint sealing system includes a floating retainer.

30. A scroll-type machine comprising:

a first scroll member having a first end plate and a first spiral wrap extending from said first end plate;

5 a second scroll member having a second end plate and a second spiral wrap extending from said second end plate, said first and second scroll members being positioned with said first and second spiral wraps interleaved with each other;

a drive member for causing said scroll members to orbit relative to one another whereby said spiral wraps will create pockets of progressively changing volume between a suction pressure zone and a discharge pressure zone;

10 a mechanism for moving said first and second scroll members between a first relationship where sealing surfaces of said first and second scroll members are in sealing relationship to close off said pockets and a second relationship where at least one of said sealing surfaces of said first and second scroll members are spaced apart to define a leak path between said pockets; and

15 a fluid injection system associated with one of said scroll members for injecting a fluid into at least one of said pockets.

31. The scroll-type machine according to Claim 30, wherein said mechanism is operated in a pulse width modulation mode.

32. The scroll-type machine according to Claim 31, wherein said fluid being injected into said at least one of said pockets is a vapor.

33. The scroll-type machine according to Claim 30, wherein said mechanism includes a solenoid valve.

34. The scroll-type machine according to Claim 33, wherein said solenoid valve is operated in a pulse width modulation mode.

35. The scroll-type machine according to Claim 30, wherein said mechanism includes a fluid operated piston secured to said first scroll, said piston being activatable to apply a force to said first scroll to move said first scroll between said first and second relationships.

36. The scroll-type machine according to Claim 35, wherein said drive member continues to operate when said first scroll member is in said second relationship.

37. The scroll-type machine according to Claim 35, wherein said fluid operated piston is operated in a time pulsed manner to modulate the capacity of said scroll-type machine.

38. The scroll-type machine according to Claim 37, wherein said fluid injection system includes a solenoid valve for controlling flow of said fluid to said one of said scroll members.

39. The scroll-type machine according to Claim 38, wherein said solenoid valve is operated in a pulse width modulation mode.

40. The scroll-type machine according to Claim 39, wherein said fluid being injected into one of said pockets is a vapor.

41. The scroll-type machine according to Claim 35, wherein said fluid being injected into said at least one of said pockets is a vapor.

42. The scroll-type machine according to Claim 30, wherein said fluid injection system includes a solenoid valve for controlling flow of said fluid to said one of said scroll members.

43. The scroll-type machine according to Claim 42, wherein said solenoid valve is operated in a pulse width modulation mode.

44. The scroll-type machine according to Claim 43, wherein said fluid being injected into one of said pockets is a vapor.

45. A scroll-type machine comprising:

a first scroll member having a first end plate and a first spiral wrap extending from said first end plate;

a second scroll member having a second end plate and a second spiral
5 wrap extending from said second end plate, said first and second scroll members being positioned with said first and second spiral wraps interleaved with each other;

a drive member for causing said scroll members to orbit relative to one another whereby said spiral wraps will create pockets of progressively changing volume between a suction pressure zone and a discharge pressure zone; and

10 a vapor injection system associated with one of said scroll members for injecting a vapor into at least one of said pockets, said vapor injection system including a valve for controlling said vapor being injected into said at least one of said pockets.

46. The scroll-type machine according to Claim 45, wherein said valve is a solenoid valve.

47. The scroll-type machine according to Claim 46, wherein said solenoid valve is operated in a pulse width modulation mode.

48. The scroll-type machine according to Claim 47, wherein said fluid being injected into one of said pockets is a vapor.